

## NOT YET WITHIN THE MAINSTREAM: CONCEPT MAPPING IN A SCOTTISH HIGH SCHOOL

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**Abstract:** Few studies exist that assess the actual uptake of concept mapping by today's high school teachers. We conducted such a study within a large and successful Scottish high school and found that concept mapping has not yet entered the mainstream of teachers' practice. Most teachers are only occasional users of mapping and the mapping that does take place is mainly mindmapping rather than concept mapping. However, teachers regard mapping highly as a learning technique and would welcome opportunities to develop their skills. We conclude that concept mapping has yet to fulfil its potential in helping schools to become learning organisations as well as in helping pupils to learn.

### 1 Introduction

Although there is now a large literature around concept mapping, few if any studies seem to have been published that assess the actual uptake of concept mapping by today's high school teachers. This gap in the literature seemed to us to merit attention, for at least three reasons. First, the authors of this paper collaborate not only in research but also in teaching novice teachers. When our students take up their placements and first posts in schools, are they likely to find that concept mapping is an established aspect of pedagogy? If not, then we must treat them as pioneers — with all the attendant challenges and difficulties that perspective implies. Second, one of us (DB) is employed within a high school as well as being an exponent of concept mapping. Information about the overall experience of concept mapping which pupils are gaining in this school is useful to guide teaching and also, perhaps, to assist the school to develop a broad strategy for staff development. Third, we share an interest in the interaction between the theory of education and the professional practice of teachers. If a promising theory is underused by teachers, what does that tell us about the theory and the teachers?

### 2 Method

James Gillespie's High School (<http://www.jghs.edin.sch.uk>) is a non-selective state-funded school located in central Edinburgh. The school has a roll of 1,100 pupils and its academic performance is high with 50% of school leavers in 2002/03 progressing to university (the average for all Edinburgh state schools is 28%, for Scotland overall it is 31%). For the present study, an informal initial survey was undertaken that indicated that two related mapping techniques, concept mapping (Novak & Gowin, 1982) and mindmapping (Buzan 1996), each had some kind of presence in the school. Subsequently a questionnaire was designed that presented examples of these two types of map (in case some teachers were uncertain of the distinction) and that sought to elicit four categories of information:

- Frequency of use of both types of map in class
- Frequency of use of both types of map outside of class
- Attitudes to mapping as a learning technique
- Factors that might stimulate an increase in the uptake of mapping

### 3 Findings

The questionnaire was distributed in March 2004 to all 82 full-time teaching staff. Questionnaires were completed by 34 teachers, representing a 41% return rate. Of the respondents 19 were male and 15 female. Most curriculum areas were represented including five teachers of English, four teachers of Science, three teachers of Mathematics, plus two teachers from each of Art, Geography, History, Modern Languages, Physical Education (PE), Personal and Social Education (PSE), and Religious and Moral Education (RME). All but ten of the respondents had at least a decade's experience in teaching.

### 3.1 Use Of Maps In Class

Table 1 shows the response to the question 'During classroom teaching, roughly how often do you ask children to create concept maps or mindmaps?'. Note that 80% of teachers are at most occasional users of mapping. Inspection of the data shows that the seven frequent users of mapping are an eclectic mix. They include but are by no means limited to the youngest teachers: three had 20+ years' teaching experience. Five were male and two were female. Their subjects included PE (both respondents from this subject were frequent mappers) and RME (likewise) but not English, Science or Mathematics. Table 2 shows the response to the question 'During classroom teaching, which of the two mapping techniques do you use more often?'. Mindmaps clearly dominate. Again, inspection of the data shows that the seven frequent mappers mostly use mindmaps rather than concept maps.

Every day	Two or three times per week	A few times per term	Never or almost never
3% (1)	18% (6)	62% (21)	18% (6)

**Table 1** Usage of maps in class (actual number of respondents shown in brackets)

More often use mindmaps	More often use concept maps	Use both about equally	Did not reply
56% (19)	15% (5)	3% (1)	26% (9)

**Table 2** Selection of map type for class use

### 3.2 Use Of Maps Outside Of Class

Many teachers are infrequent users of computers in classrooms, but frequent users outside (Cuban 2001). We were interested in whether a similar picture might hold true of mapping, so we asked: 'Outside of classroom teaching, roughly how often do you personally create concept maps or mindmaps (for example, as a study aid or planning and preparation technique)?'. The responses are shown in Table 3. It appears that teachers' use of mapping outside of class is even less frequent than their usage within. Inspection of the data shows that in-class use largely predicts out-of-class use. We also asked whether out-of-class use favoured concept maps or mindmaps: again, mindmaps dominated.

Every day	Two or three times per week	A few times per term	Never or almost never
6% (2)	9% (3)	47% (16)	38% (13)

**Table 3** Usage of maps outside class

### 3.3 Attitudes to Mapping

Table 4 shows the responses of teachers to questions that were intended to elicit their attitudes to mapping. The data shows unanimity that concept mapping or mindmapping are good learning techniques. Large majorities believe that they are relevant to teachers' subjects and not fads. Inspection of the data reveals that those who expressed doubt about relevance were teachers of art (2), music (1) and modern languages (2). The individual who believed that mapping was a fad was a modern languages teacher.

	Strongly disagree	Disagree	Agree	Strongly agree
Asking children to create concept maps or mindmaps is often a good way to help them to learn.	0% (0)	0% (0)	50% (17)	47% (16)
Concept mapping and mindmapping are not very relevant for my subject.	41% (14)	38% (13)	12% (4)	3% (1)
Concept mapping and mindmapping are mainly fads. They have little real value.	41% (14)	53% (18)	3% (1)	0% (0)

**Table 4** Attitudes to mapping

### 3.4 Stimulus to change

We sought to discover whether any of three kinds of change — concerning access to computers, staff development, and a less busy curriculum — might act as a stimulus to increase the uptake of mapping. Table 5 shows the results. As can be seen, there is some support for all three kinds of change and a large majority favours staff development. Inspection of the data shows that all seven frequent users of mapping favour staff development and five of them also recommend good access to computers.

	Strongly disagree	Disagree	Agree	Strongly agree
If I had good access to computers I would make more use of software for concept mapping or mindmapping with my classes.	12% (4)	32% (11)	44% (15)	9% (3)
There should be more opportunities for staff development in concept mapping and mindmapping.	3% (1)	12% (4)	68% (23)	18% (6)
I'm usually too busy trying to get through the course to make time for concept mapping or mindmapping.	21% (7)	41% (14)	24% (8)	9% (3)

**Table 5** Attitudes to mapping

### 3.5 Gender, Age and Subject Differences

We found in the data no statistically significant differences between male and female respondents, nor between those who had different lengths of service in teaching, nor with one exception, between subject disciplines (but note that the numbers per subject discipline are small). The exception was the unanimous belief held by teachers of English that better access to computers would increase uptake of mapping: among the seven teachers of Mathematics and Science, only one held this view.

## 4 Discussion

The picture that emerges from the data is fairly clear and has both negative and positive aspects. The negative is that at JGHS, concept mapping has not yet found itself a place within the mainstream of teachers' practice. The positive is that JGHS teachers nevertheless regard mapping highly as a learning technique and would welcome opportunities, especially staff development, that might stimulate its increased use. Thus, the lack of uptake for mapping seems likely to reflect mainly teachers' lack of confidence and skill in how to incorporate concept mapping within their teaching repertoire: this encourages us to believe that with the right kind of support, the situation could change. An in-house staff development course for JGHS staff will be launched in session 2004/05 and information technology resources to support mapping are being enhanced.

An interesting feature is the stronger showing of mindmapping relative to concept mapping. A mindmap is essentially a restricted form of concept map (i.e. with a star topology and where the absent relational links implicitly stand for 'is associated with' or some such vague verbal phrase). We do not doubt that concept mapping is a more flexible technique, but perhaps a little harder to learn. We suspect that JGHS teachers' apparent preference for mindmapping reflects not so much an informed selection on their part as it does some high-profile promotion of mindmapping in Scotland by people who at times, have made inflated claims for its efficacy.

Without a larger-scale study, we cannot be sure that the findings of this study apply more generally to other Scottish high schools. However, we would be surprised if the overall situation is very different from what we uncovered. Aside from the fact that JGHS has an excellent reputation, there is evidence that a rather wide gap has developed between the findings of education research and the knowledge of Scottish teachers generally (MacLellan & Sodden 2003). It is entirely credible that the plentiful research that over three decades has demonstrated concept mapping's utility as a learning technique has not yet much impacted upon the teaching profession.

In conclusion then, we endorse the observation of Novak (1998) that schools need to become learning organisations. Crucially, they need to learn *how* to learn as communities. There are a few welcome signs of movement in this direction in Scottish education today. But it will require a large shift to reverse the culture of managerialism that has long been dominant and which one analyst has characterised thus:

The last ten or fifteen years have seen continual attacks on [Scottish teachers'] autonomy, combined with increasing requirements for the 'delivery' of externally prescribed curriculum content and teaching methods; and their confidence has been undermined by insistent monitoring of their teaching in accordance with control devices such as 'performance indicators' ... many deplore the 'de-professionalisation' and the de-skilling which come from treating teachers as mere technicians rather than experienced professional educators. (Gatherer 2003 p1027).

The potential is there for concept mapping to assist schools to become learning communities, thereby reasserting teachers' professionalism, as well as helping their pupils to learn.

## 5 References

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